

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:

Cowling Creek Hatchery and Satellite
Incubation and Rearing Facilities

**Species or
Hatchery Stock:**

Chum

Agency/Operator:

Suquamish Tribe

Watershed and Region:

East Kitsap WRIA-15

Date Submitted:

December 18, 2001

Date Last Updated:

March 16, 2003

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Cowling Creek Hatchery and Satellite Rearing Sites

1.2) Species and population (or stock) under propagation, and ESA status.

Chum salmon, *Oncorhynchus keta*. Cowling Creek Hatchery chum are derived from local Chico Creek wild fall chum broodstock. The ESA status is that they are not listed.

1.3) Responsible organization and individuals.

Name (and title): Paul Dorn, Salmon Recovery Coordinator
Mike Huff, Salmon Enhancement Program Manager
Gary Ives, Hatchery Manager

Agency or Tribe: Suquamish Tribe

Address: P.O. Box 498, Suquamish WA 98392

Telephone: 360 394 5245 or 394 5258 or 394-5327

Fax: 360 598-4666

Email: pdorn@suquamish.nsn.us
mhuff@suquamish.nsn.us
gives@suquamish.nsn.us

Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

The NWIFC provides fish health documentation (adult certification, juvenile inspections); volunteer groups including Trout Unlimited, Chums of Barker Creek, local school districts (classroom aquaria), and private landowners maintain satellite facilities.

1.4) Funding source, staffing level, and annual hatchery program operational costs.

The primary program funding comes from the BIA and Tribe. Tribal income includes income generated from carcass/egg sales. Other funding sources include WWIETP and volunteers' donated time. Five full time staff and five part-time staff work the equivalent of fulltime for four months. The permanent staff operate the Tribe's chinook and coho programs for the balance of the year. The chum program costs \$72,000.00 annually.

1.5) Location(s) of hatchery and associated facilities.

All Tribal chum facilities are located in East Kitsap County. The program is in its' third quarantine year for IHN virus detected in low titer in 2000. Although no disease outbreaks have occurred, transfers to the satellite facilities must be 100% screened and virus-free. This limit constrains our releases to the following satellite facilities:

Cowling Creek WRIA #15.0298 Tributary to Miller Bay
Dogfish Creek WRIA #15.0285 Tributary to Liberty Bay
Clear Creek WRIA #15.0249 Tributary to Dyes Inlet
Barker Creek WRIA #15.0255 Tributary to Dyes Inlet
Steele Creek WRIA #15.0273 Tributary to Burke Bay

1.6) Type of program.

Integrated Recovery.

1.7) Purpose (Goal) of program.

To restore chum salmon runs to the larger local streams to support the Tribal Treaty chum terminal fishery in Area 10E and mixed stock fisheries. Presently the Tribe depends on one stream, Chico Creek, for most of their terminal chum fishery.

1.8) Justification for the program.

The Suquamish program will:

A. (1.8.1) Provide fall chum salmon for tribal subsistence, ceremonial and commercial fishers. These fish will also be intercepted by Alaskan, Canadian, and Washington non-Treaty commercial fishers. There will also be interceptions by sport fisheries.

1.9) List of program "Performance Standards".

The Suquamish Program will:

A. (1.9.1) Utilize Cowling Creek Hatchery to spawn approximately 4,000 adults for 2.3 million eggs to produce the following: 500,000 zero age South Cowling smolts; 1,200,000 zero age at North Cowling, 600,000 to be planted in East Kitsap Tributary's; all released into Area 10E.

B. (1.9.2) Harvest all broodstock from Cowling Creek Hatchery returns. No directed Tribal terminal harvest occurs on this run.

C. (1.9.3) Isolate the hatchery chum program populations and rear the hatchery chum to maximize homing and minimize straying from Area 10E.

1.10) List of program "Performance Indicators", designated by "benefits" and "risks."

1.10.1) "Performance Indicators" addressing benefits.

A. (1.10.1.1.) The Cowling Creek brood stock return remains at a yearly average of 7,000 adults. The rate of survival from green egg to release is approximately 82%.

B. (1.10.1.2) Tribal, commercial, and sport terminal fisheries have an opportunity to harvest adult salmon in mixed stock managed areas and in the terminal area.

1.10.2) "Performance Indicators" addressing risks.

All of the adult chum returning to the Cowling Creek rack are counted. We also take two hundred scale samples weekly throughout the run duration. These scale samples are read by WDFW biologists and the results are public knowledge.

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

We utilize a minimum of 4,000 adults for spawning. The egg take goal of the Suquamish Tribe's chum program is 2,300,000 eggs. When time/manpower allow, a reduced number of eggs are taken from a greater number of females to optimize the progeny's genetic variation. The hatchery is designed to provide a greater number of eggs should the program require expansion to meet future enhancement goals or Tribal harvest, subsistence, or ceremonial goals.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location.

(Use standardized life stage definitions by species presented in Attachment 2).

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry	Dogfish Cr/ Clear Cr./ Barker Cr./Steele Creek	600,000 (during quarantine)
Fry	South & North Cowling	1.7 million (during quarantine)
Fingerling		
Yearling		

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

Release yr	Number Released	Size	Date	Adult Return rack	
1977	60,500	600			
1978	500,000	414			
1979	124,000	498			
1980	428,900	506			
1981	640,680	407			
1982	641,635	403		550	
1983	763,220	500		1,261	
1984	600,000	494		1,211	
1985	514,603	450		5,451	
1986	556,332	704		7,868	
1987	500,000	530		3,605	
1988	403,629	612		2,544	
1989	560,638	700		1,993	
1990	536,929	389		3,886	
1991	559,958	367		2,106	
1992	512,661	334		2,572	
1993	522,492	421		4,046	
1994	520,498	595		15,700	
1995	502,852	551		8,111	
1996	555,484	582		13,386	
1997	458,650	344		8,383	
1998	615,952	373		29,941	
1999	534,954	480		5,465	
2000	492,863	394		3,997	
2001	1,380,324	550		18,747	
2002	998,349	515		10,182	

1.13) Date program started (years in operation), or is expected to start.

Started in 1977, and been in continuous operation ever since.

1.14) Expected duration of program.

Indefinitely, or until salmon recovery actions are complete.

1.15) Watersheds targeted by program.

WRIA 15.0298 (Cowling Creek) and East Kitsap watersheds identified below.

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

The use of Quilcene chum salmon (Hood Canal) was considered as a brood source because it was available from a Federal hatchery in Hood Canal, but discarded because it was non-native to East Kitsap. No action was not considered a Tribal option.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

2.1) List all ESA permits or authorizations in hand for the hatchery program.

None are required

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

Not applicable to this program.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.

Puget Sound chinook are listed in the waters into which the Cowling Creek Hatchery and satellite facility releases occur.

- Identify the ESA-listed population(s) that will be directly affected by the program.

None.

- Identify the ESA-listed population(s) that may be incidentally affected by the program.

None.

2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to “critical” and “viable” population thresholds (*see definitions in “Attachment 1”*).

Not Applicable to this program.

-Provide the most recent 12-year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

Not Applicable to this program.

- Provide the most recent 12-year (e.g. 1988-1999) annual spawning abundance

estimates, or any other abundance information. Indicate the source of these data.
(Include estimates of juvenile habitat seeding relative to capacity or natural fish densities, if available).

Not applicable to this program.

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

Not applicable to this program.

2.2.2) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take (see "Attachment 1" for definition of "take").

Not applicable to this program.

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

(e.g. "Broodstock collection directed at sockeye salmon has a "high" potential to take listed spring chinook salmon, through migrational delay, capture, handling, and upstream release, during trap operation at Tumwater Falls Dam between July 1 and October 15. Trapping and handling devices and methods may lead to injury to listed fish through descaling, delayed migration and spawning, or delayed mortality as a result of injury or increased susceptibility to predation").

Not applicable to this program.

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

Not applicable to this program.

- Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).

Complete the appended "take table" (Table 1) for this purpose. Provide a range of potential take numbers to account for alternate or "worst case" scenarios.

Not applicable to this program.

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

(e.g. "The number of days that steelhead are trapped at Priest Rapids Dam will be reduced if the total mortality of handled fish is projected in season to exceed the 1988-99 maximum observed level of 100 fish.")

Not applicable to this program.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER

MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review Report and Recommendations* - NPPC document 99-15). Explain any proposed deviations from the plan or policies.
The hatchery program's production level is agreed upon by the co-managers future brood document.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates. This program is consistent with the WDFW- Tribal harvest management plans and agreements.

3.3) Relationship to harvest objectives.

This program is consistent with the WDFW- Tribal harvest management plans and agreements.

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1990-02), if available.

Treaty and non-treaty commercial fishers and sportsman benefit from the chum produced from these facilities. GSI sampling indicate the Cowling Creek chum are electrophoretically identical to East Kitsap populations. Cowling chum are harvested directly by mixed stock fisheries in Areas 9 and 10 although fish ticket data doesn't identify the local area fished. Cowling Creek facility chum are harvested in proportion to the numbers released in terminal area 10E, although only overall harvest numbers are reported. Contribution to fisheries is estimated by size of release and total harvest.

3.4) Relationship to habitat protection and recovery strategies.

The program is integral to protecting East Kitsap County's many small, low gradient creeks. Man in some way has impacted most of these streams. This has reduced the ability to consistently contribute naturally produced chum. The chum enhancement program is designed to contribute to stewardship, habitat preservation, and habitat restoration. It's intended that other species benefit from the Tribe's chum program.

3.5) Ecological interactions.

Juvenile chum provide food for other fish and wildlife by transferring zooplankton energy into larger food "packets". As chum mature they are consumed by other fish, birds, and marine mammals. When they return to spawn, their marine-derived nutrients are an important energy source for the terrestrial environment. Gravel cleaning and wildlife nourishment are important ecological interactions the adults provide to improve stream habitat and nourish watershed health. There are no known negative ecological interactions with listed species.

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

The water sources are the various East Kitsap surface waters utilized for Cowling chum incubation and rearing. These streams have low flows of less than 10 cfs and natural production is limited by rainfall. Drought years limit returning chum access to the upper watersheds. Cowling Creek's low flow is less than 100 gpm prevents natural spawning.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

It's assumed that listed species utilize all the marine habitat of East Kitsap to forage while juveniles. Grovers Creek (chinook) Hatchery is located one mile up Miller Bay from the Cowling Creek Hatchery adult recapture facility. No chinook adults have ever been captured at Cowling Creek Hatchery in 26 years of operation. The operation of Cowling Creek Hatchery and its small production size limits any impact to listed species. Hatchery water withdrawal, screening, and effluent discharge have no effect on listed species.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods). Adults swim into an intertidal sheet-pile fish trap/return holding pond (100,000 cubic feet). They are beach seined from the pond, checked for ripeness, killed and transported via a fish lift to the spawning shed.

5.2) Fish transportation equipment (description of pen, tank truck, or container used). Chum are spawned in the spawning shed, eggs allowed to water harden in 5 gallon buckets for two hours, then transported upstream by truck to the incubators.

5.3) Broodstock holding and spawning facilities.

The adult holding pond is a sheet pile dam that holds 100,000 cubic feet of saltwater to prevent the adult chum from spawning at the hatchery rack. A fish ladder provides access for the salmon into the pond at tidal elevations below high tide. The spawning facilities are a permanent shed (16'x25') with light/power/heat/creek water/and chlorinated water for disinfection. A large tent (30'x40') provides sorting, sexing, and data collection as well as a loading area to transfer carcasses to trucks for distribution.

5.4) Incubation facilities.

All eggs are incubated on gravity-supplied ambient stream water. The eggs are incubated in four Netarts raceways (low matrix incubators) on South Cowling Creek. Each raceway is 32 feet long and comprised of 4 foot square cells. Five deep matrix incubators are located on North Cowling Creek. Both creeks flow into the adult recapture pond. The satellite facilities are all comprised of Netarts incubators feed by gravity-supplied ambient water.

5.5) Rearing facilities.

The 2,500 cubic foot earthen rearing pond on South Cowling creek is located immediately downstream of the incubators. Two 1,200 cubic foot earthen ponds are located on North Cowling Creek immediately downstream of the incubators. In general, only the Cowling Hatchery chum are fed (4 to 6 weeks) before release at this time. Almost all satellite incubation facilities release unfed fry.

5.6) Acclimation/release facilities.

Hatchery chum are fed in an earthen pond located directly downstream of the incubation facilities. The target release size is 400 ffp, or 1 gram. The fed chum are released from their rearing pond post midnight on high tide. A scuba diver checks for any unusual predation events, or any anomalies in fry behavior, in the estuary. The unfed fry at satellite facilities volitionally migrate from their eggboxes downstream to the estuary. Imprinting is high at all facilities.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

Most watersheds are impacted by urbanization to some degree that results in siltation being above natural rates. Cleaning debris from intake screens and cleaning silt from eyed eggs to reduce mortality is generally required. The use of ambient water, with high flow silt loads, results in spawned to release mortality being below 90%. The intertidal location of the adult recapture facility allows staff to check for ripeness in the traditional manner, but some males pass inspection with “stringy” sperm. This sperm motility appears not to be activated by the adult males immersion in freshwater and can lead to lower rates of fertilization. The use of backup males helps check this problem.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

The hatchery is located on a very small stream that has no natural runs of any salmon. The adults are harvested at a time of year when no chinook are present. All incubation occurs on very small amounts of non-consumptive ambient stream water diverted from streams that does not impact any natural spawning or rearing habitat. The chum are released at a size that does not compete with listed species.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source.

Hood Canal (Quilcene) broodstock were used in 1977, but the returning adults were not spawned. Local broodstock were harvested from Chico Creek in 1978, 1979, 1980, and 1981 for Cowling Creek Hatchery. The hatchery has utilized the Chico Creek progeny returning to the hatchery rack ever since.

6.2) Supporting information.

6.2.1) History.

The program started with Hood Canal stock eggs. This egg source was changed to Chico stock eggs and have been the source of broodstock.

6.2.2) Annual size.

The program has maintained a fairly constant size. Cowling Creek Hatchery releases have been approximately 500,000 fed fry with an additional 2,000,000 eyed eggs transported to the satellite incubation facilities. The identification of IHN in the broodstock has resulted in a scaling back of the satellite facilities to approximately 600,000 unfed fry, with the balance released from Cowling Creek Hatchery to allow the Tribe the opportunity to generate operational funds from the returning surplus broodstock.

6.2.3) Past and proposed level of natural fish in broodstock.

The hatchery run is comprised mostly of adults returning from hatchery releases. While there are no identifying marks on the hatchery fish, no adult chum returned to either Cowling Creek or nearby Grovers Creek prior to releases of Cowling Creek Hatchery fed chum. The program was put in place with the intent of importing male gametes from Chico Creek annually to avoid domestication and other possible hatchery impacts. Lack of funds prevented this from happening, but it's still a hatchery program goal.

6.2.4) Genetic or ecological differences.

None are intended between Cowling Creek Hatchery and Chico Creek wild stock.

6.2.5) Reasons for choosing.

Chico Creek stock is the nearest available wild broodstock in East Kitsap.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

Adult chum are spawned from the first fish to the last fish throughout the run. The adult chum are spawned one on one (two females and two males per bucket). The adult chum run timing makes interaction with listed chinook unlikely. No chinook adults have ever been seen by hatchery staff at Cowling Creek Hatchery.

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Eggs are spawned from the returning adult broodstock.

7.2) Collection or sampling design.

Adults are collected in proportion to the entire run timing. Adult chum are randomly selected for spawning. Because of the large effective population size ($N > 2,000$) there is no need to set up a sampling matrix. 200 adults are sampled for scales each week.

7.3) Identity.

The broodstock are Cowling Creek Hatchery chum release survivors.

7.4) Proposed number to be collected:

The escapement goal is 4,000 adults.

7.4.1) Program goal (assuming 1:1 sex ratio for adults):

4,000 adults to yield 2.3 million eyed eggs (excess to be discarded).

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Year	Adults Females	Males	Jacks	Eggs (green)	Juveniles
1982	320	230			
1983	734	527			
1984	626	585			
1985	3,515	1,936			
1986	4,226	3,042			
1987	2,190	1,415			
1988	1,549	995			
1989	1,224	769			
1990	2,352	1,534			
1991	1,322	784		2,184,144	1,338,556
1992	1,677	895		3,077,784	2,112,443
1993	2,186	1,860		2,065,223	1,494,419
1994	8,245	7,455		7,883,402	2,666,352
1995	3,755	4,356		4,130,001	1,853,897
1996	6,006	7,380		2,775,206	1,433,060
1997	3,432	4,951		3,967,766	1,683,423
1998	13,731	16,210		3,717,481	1,403,485
1999	2,227	3,238		2,166,547	1,254,820
2000	1921	2076		1,539,935	1,254,820
2001	9712	9079		1,902,954	1,549,061
2002	4716	5467		2,192,000	

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

Salmon carcasses to tribal members and the general public, surplus eggs are sold to generate Tribal operating revenue for the hatchery program.

7.6) Fish transportation and holding methods.

Adult chum return to Cowling Creek Hatchery holding pond and spawned when ripe. Water-hardened eggs are trucked upstream to the incubation facility. Eyed eggs are trucked to satellite incubation boxes except for a minimum of 500,000 (representative of the adult run distribution) that are fed on-site, then released on-site.

7.7) Describe fish health maintenance and sanitation procedures applied.

NWIFC samples adults for virus, bacteria, and ectoparasites for certification of the adult broodstock. Fed juveniles are sampled by NWIFC to be certified healthy prior to release.

7.8) Disposition of carcasses.

Most salmon carcasses are distributed to tribal members and the general public. Approximately 10 % are left in the estuary for the benefit of fish and wildlife.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

None needed.

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1) Selection method.

Chum adults are randomly selected for spawning. The number selected for egg taking is determined by the fecundity and overall run timing.

8.2) Males.

One male to one female is used. (In practice, a second male and a second female is used in each bucket.

8.3) Fertilization.

Eggs are fertilized and rinsed with ambient creek water several times, quantified, then added to a five-gallon bucket which contains iodophore for water hardening. The eggs are water hardened in iodophor between one to two hours. They are then laid down in the netarts incubators.

8.4) Cryopreserved gametes.

None

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating

scheme.
None required.

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. “egg to smolt survival”) that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Return year	Females	Males	Green eggs	Eyed eggs	Released
1991	1,322	784	2,184,144	1,794,529	1,338,556
1992	1,677	895	3,077,784	2,619,391	2,112,443
1993	2,186	1,860	2,065,223	2,044,136	1,494,419
1994	8,245	7,455	7,883,402	5,197,783	2,666,352
1995	3,755	4,356	4,130,001	3,260,001	1,853,897
1996	6,006	7,380	2,775,206	2,166,612	1,433,060
1997	3,432	4,951	3,967,766	2,279,523	1,683,423
1998	13,731	16,210	3,717,481	2,440,284	1,403,485
1999	2,227	3,238	2,166,547	2,142,646	1,254,820
2000	1,921	2,076	1,539,935	1,305,030	1,254,820
2001	9,712	9079	1,902,954	1,892,424	1,549,061
2002	4,716	5,467	2,192,000		

9.1.2) Cause for, and disposition of surplus egg takes.

Surplus eggs are sold to the caviar market to generate program funding.

9.1.3) Loading densities applied during incubation.

2,500 eggs per square foot.

9.1.4) Incubation conditions.

Temperature, flow, and DO are checked everyday. The eggs are in darkness and are ambient water. Formalin treatments occur three times weekly until hatching.

9.1.5) Ponding.

Ponding is estimated by cumulative temperature units gained. Visual inspection of alevin activity within the incubators determines when the outflow screens are removed. The first fry volitionally outmigrate into 6' diameter circular ponds for initial feeding. The current in these circulars promotes rapid feeding behavior targeting on the starter feed. When the fry actively feed on the artificial diet, they released to the earth pond downstream to continue feeding. All subsequent emergent fry from the incubators are volitionally released to the earth pond where they mimic the behavior of their feeding siblings.

9.1.6) Fish health maintenance and monitoring.

Dead fry are removed from the pond daily and this data is recorded along with temperature, flow, and DO. Hatchery personnel check gills and skin scrapings under the microscope weekly and NWIFC pathologists inspect the fry monthly. All observations are recorded in hatchery reports.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.
None needed.

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

Return year	Females	Males	Green eggs	Eyed eggs	Released
1991	1,322	784	2,184,144	1,794,529	1,338,556
1992	1,677	895	3,077,784	2,619,391	2,112,443
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1999	2,227	3,238	2,166,547	2,142,646	1,254,820
2000	1,921	2,076	1,539,935	1,305,030	1,254,820
2001	1203	2612	1,902,954	1,892,424	1,749,061

9.2.2) Density and loading criteria (goals and actual levels).

Loading never exceeds our goal of half a pound of fish per cubic foot.

9.2.3) Fish rearing conditions.

Cowling Creek Hatchery has always utilized a Natures Model natural instream rearing protocol. Birdnets and electric fences are used to control predation.

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Weekly weight samples are used to adjust feed schedules. All data was recorded into Pond Manager software. We now record data into HatPro software. Condition factors are not recorded for chum salmon.

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

The hatchery chum grow from 1200 fpp to 400 fpp in approximately one month.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Bioproducts, feed six times daily based on body size and temperature (averages approximately 2-3 percent).

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

Hatchery staff and NWIFC pathologists monitor fish health and apply any disease medications. Sanitation isn't a problem due to the short duration (6 weeks) and small size (500,000 chum fry) of the program.

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

None.

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

The rearing ponds are natural earth/gravel bottom with LWD and healthy riparian vegetation (maturing second growth conifer forest).

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation

None required.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

Fry reared at Cowling pushed out at night. The chum reared at satellite facilities are released volitionally.

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry	600,000	1200		Dogfish Cr/ Clear Cr./ Barker Cr./Steele Creek
Fry	1.2 million	400		South & North Cowling
Fingerling				
Yearling				

10.2) Specific location(s) of proposed release(s). These are the sites that are active now:

Dogfish Creek WRIA #15.0285 Tributary to Liberty Bay
Clear Creek WRIA #15.0249 Tributary to Dyes Inlet
Barker Creek WRIA #15.0255 Tributary to Dyes Inlet
Steele Creek WRIA #15.0273 Tributary to Burke Bay
(All in East Kitsap County Washington State)

10.3) Actual numbers and sizes of fish released by age class through the program.

Brood Yr	Rel Year	Release	Release	Reared	Release Location	# Released	per/lb	Fry	Size	Broodstock
1978	1979	05/31/79	05/31/79	31	Cowling Creek 15.0298	124,000	498			Chico Creek
1979	1980	05/08/80	05/12/80	30	Cowling Creek 15.0298	428,900	512			Chico Creek
"	"	05/12/80	05/12/80	30	Johnson Cr. 15.0284	45,000	560			Chico Creek
"	"	04/15/80	4/31/80	0	Dickerson Cr. 15.0231			214,000	1250	Chico Creek
1980	1981	04/20/81	05/06/81	49	Cowling Creek 15.0298	640,680	407			Chico Creek
"	"	04/20/81	05/20/81	0	Dickerson Cr. 15.0231			129,550	1250	Chico Creek
1981	1982	05/29/82	05/29/81	0	Cowling Creek 15.0298	641,635	403			Cowling Creek
1982	1983	04/26/83	04/30/83	45	Cowling Creek 15.0298	763,220	500			Cowling Creek
"	"	04/18/83	04/20/83	20	Dickerson Cr. 15.0231			149,450	950	Cowling Creek
1983	1984	05/02/84	05/02/84		Cowling Creek 15.0298	600,000	494			Cowling Creek
"	"	04/19/84	04/19/84		Dickerson Cr. 15.0231			500,000	1200	Cowling Creek
"	"	04/19/84	04/19/84		Dogfish Creek 15.0285			100,000	1200	Cowling Creek
"	"	05/01/84	05/01/84		Big Scandia 15.0280			50,000	800	Cowling Creek
"	"	04/16/84	04/16/84		Clear Creek 15.0251			400,000	1200	Cowling Creek
1984	1985	05/18/85	05/19/85	41	Cowling Creek 15.0298	514,603	450			Cowling Creek
"	"	Apr-85	Apr-85	0	Hwy 305 Morris 15.0285			82,698	1200	Cowling Creek
"	"	5/24/85	5/24/85	51	Big Scandia 15.0280	281,520	400			Cowling Creek
"	"	5/21/85	5/21/85	0	Dickerson Cr. 15.0231			182,709	1200	Cowling Creek

"	"	Apr-85	Apr-85	0	Big Valley	15.0285		80,192	1200	Cowling Creek
"	"	4/3/85	4/3/85	0	Al Urban	15.0285		60,144	1200	Cowling Creek
1985	1985	5/21/85	5/21/85	0	Ruby Creek			24,310	1200	Gorst
"	"	5/8/85	5/8/85	0	Gorst Creek	15.0216		164,909	1200	Gorst
1985	1986	5/18/86	5/21/86	31	Cowling Creek	15.0298	556,332	704		Cowling Creek
"	"	2/10/86	2/11/86	0	Clear Creek	15.0251		211,198	1200	Cowling Creek
"	"	2/26/86	2/26/86	0	Johnson Cr. Liberty Bay			105,252	1200	Cowling Creek
"	"	4/25/86	4/25/86	0	Big Valley	15.0285		80,192	1200	Cowling Creek
"	"	4/25/86	4/25/86	0	Al Urban	15.0285		240,576	1200	Cowling Creek
"	"	5/8/86	5/8/86	0	Big Scandia	15.0280		980,340	1200	Cowling Creek
"	"	5/9/86	5/9/86	0	Barker Creek	15.0255		320,768	1200	Cowling Creek
"	"	5/9/86	5/9/86	0	Little Scandia	15.0279		160,384	1200	Cowling Creek
"	"	5/14/86	5/14/86	0	Dickerson Cr.	15.0231		505,711	1200	Chico Creek
"	"	5/15/86	5/15/86	0	Morris (Hwy 305)			5,587	1200	Cowling Creek
1986	1986	3/18/86	3/18/86	0	Gorst Creek	15.0216		100,000	1200	Gorst
"	"	5/22/86	5/22/86	0	Ruby Creek			221,314	1200	Gorst
1987	1988	4/7/88	4/7/88		Cowling Creek	15.0298	200,000	950		Cowling Creek
"	"	5/10/88	5/10/88	44	Cowling Creek	15.0298	403,629	612		Cowling Creek
"	"	2/17/88	2/17/88	0	Clear Creek	15.0251		261,877	1100	Cowling Creek
"	"	4/15/88	4/15/88	0	Clear Creek	15.0251		224,217	1100	Cowling Creek
"	"	4/18/88	4/18/88	0	Barker Creek	15.0255		186,802	1100	Cowling Creek
"	"	2/10/88	2/10/88	0	Libery Bay Trib.	15.0283		100,240	1100	Cowling Creek
"	"	2/10/88	2/10/88	0	Strawberry Creek	15.0246		60,144	1100	Cowling Creek
"	"	4/7/88	4/7/88	0	Dickerson Cr.	15.0231		712,129	1100	Cowling Creek
"	"	4/19/88	4/19/88	0	Dogfish Creek	15.0285		53,879	1100	Cowling Creek
"	"	4/14/88	4/14/88	0	Dogfish Creek	15.0285		317,751	1100	Cowling Creek
"	"	4/15/88	4/15/88	0	Dogfish Creek	15.0285		220,555	1100	Cowling Creek
"	"	4/12/88	4/12/88	0	Big Scandia	15.0280		871,470	1100	Cowling Creek
"	"	4/13/88	4/13/88	0	Little Scandia	15.0279		160,755	1100	Cowling Creek
"	"	4/18/88	4/18/88	0	Steele Creek	15.0273		70,168	1100	Cowling Creek
1988	1989	5/2/89	5/2/89	0	Cowling Creek	15.0298	560,638	700		Cowling Creek
"	"	1/14/89	1/14/89	0	Clear Creek	15.0251		85,300	1100	Cowling Creek
"	"	4/20/89	4/20/89	0	Dickerson Cr.	15.0231		477,898	1100	Cowling Creek
"	"	3/13/89	3/13/89	0	Barker Creek	15.0255		113,084	1100	Cowling Creek
"	"	1/31/89	1/31/89	0	MF Johnson	15.0284		42,300	1100	Cowling Creek
"	"	4/12/89	4/12/89	0	Big Scandia	15.0280		109,337	1100	Cowling Creek
"	"	4/12/89	4/12/89	0	Steele Creek	15.0273		239,052	1100	Cowling Creek
"	"	4/4/89	4/4/89	0	Dogfish Creek	15.0285		261,733	1100	Cowling Creek
"	"	4/13/89	4/13/89	0	Clear Creek Trib (0250)			455,840	1100	Cowling Creek
"	"	4/26/89	4/26/89	0	Little Scandia	15.0279		58,413	1100	Cowling Creek
1989	1990	5/1/90	5/29/90	55	Cowling Creek	15.0298	536,929	389		Cowling Creek
"	"	5/3/90	5/3/90	0	Barker Creek	15.0255	105,374	833		Cowling Creek
"	"	5/7/90	5/7/90	0	Steele Creek	15.0273		196,103	1100	Cowling Creek
"	"	4/6/90	4/23/90	0	Dickerson Cr.	15.0231		690,722	1100	Cowling Creek
"	"	4/25/90	4/25/90	0	Clear Creek	15.0251		171,561	1100	Cowling Creek

"	"	4/26/90	4/26/90	0	Big Scandia	15.0280			192,159	1100	Cowling Creek
"	"	4/24/90	4/24/90	0	Dogfish Creek	15.0285			232,886	1100	Cowling Creek
1990	1991	5/13/91	5/22/91	52	Cowling Creek	15.0298	559,958	367			Cowling Creek
"	"	5/8/91	5/8/91	0	Barker Creek	15.0255			219,890	1100	Cowling Creek
"	"	5/2/91	5/7/91	0	Dickerson Cr.	15.0231			654,214	1100	Cowling Creek
"	"	5/6/91	5/6/91	0	Dogfish Creek	15.0285			218,459	1100	Cowling Creek
1990	1991	5/3/91	5/8/91	0	Kegley	15.0251			600,810	1100	Cowling Creek
"	"	5/6/91	5/7/91	0	Big Scandia	15.0280			415,951	1100	Cowling Creek
"	"	4/9/91	5/6/91	0	Clear Creek	15.0251			416,247	1100	Cowling Creek
"	"	5/7/91	5/7/91	0	Steele Creek	15.0273			35,525	1100	Cowling Creek
1991	1992	5/2/92	5/13/92	70	Cowling Creek	15.0298	512,661	334			Cowling Creek
"	"	4/16/92	4/16/92	0	Barker Creek	15.0255			160,892	1100	Cowling Creek
"	"	4/16/92	4/16/92	0	Dickerson Cr.	15.0231			40,120	1100	Cowling Creek
"	"	4/14/92	4/14/92	0	Dogfish Creek	15.0285			186,145	1100	Cowling Creek
"	"	4/16/92	4/16/92	0	Kegley	15.0251			108,487	1100	Cowling Creek
"	"	4/16/92	4/16/92	0	Big Scandia	15.0280			185,815	1100	Cowling Creek
"	"	4/14/92	4/14/92	0	Clear Creek	15.0251			144,436	1100	Cowling Creek
1992	1993	5/6/93	5/22/93	60	Cowling Creek	15.0298	522,492	421			Cowling Creek
"	"	4/13/93	4/27/93	0	Dickerson Cr.	15.0231			392,001	1100	Cowling Creek
"	"	4/13/93	4/13/93	0	Barker Creek	15.0255			240,215	1100	Cowling Creek
"	"	4/29/93	4/29/93	0	Dogfish Creek	15.0285			254,460	1100	Cowling Creek
"	"	4/15/93	4/27/93	0	Big Scandia	15.0280			312,894	1100	Cowling Creek
"	"	4/20/93	4/20/93	0	Clear Creek	15.0251			163,281	1100	Cowling Creek
"	"	4/30/93	4/30/93	0	Cowling Creek	15.0298			162,008	1100	Cowling Creek
"	"	4/20/93	4/20/93	0	Steele Creek	15.0273			65,092	1100	Cowling Creek
1993	1994	5/8/94	5/8/94	37	Cowling Creek	15.0298	520,498	595			Cowling Creek
"	"	4/18/94	4/18/94	0	Barker Creek	15.0255			224,018	1100	Cowling Creek
"	"	4/21/94	4/21/94	0	Clear Brook	15.0251			13,251	1100	Cowling Creek
"	"	4/20/94	4/20/94	0	Dickerson Cr.	15.0231			195,420	1100	Cowling Creek
"	"	4/24/94	4/24/94	0	Kegley	15.0251			8,731	1100	Cowling Creek
"	"	4/15/94	4/15/94	0	Big Scandia	15.0280			154,796	1100	Cowling Creek
"	"	5/7/94	5/7/94	0	Dogfish Creek	15.0285			212,906	1100	Cowling Creek
"	"	4/4/94	4/4/94	0	Clear Creek	15.0251			164,799	1100	Cowling Creek
1994	1995	5/2/95	5/2/95	42	Cowling Creek	15.0298	502,852	551			Cowling Creek
"	"	5/3/95	5/3/95	0	Barker Creek	15.0255			205,790	1100	Cowling Creek
"	"	4/19/95	4/19/95	0	Clear Creek	15.0251			210,732	1100	Cowling Creek
"	"	5/11/95	5/11/95	0	Clear Brook	15.0251			231,753	1100	Cowling Creek
"	"	4/26/95	5/4/95	0	Dickerson Cr.	15.0231			648,301	1100	Cowling Creek
"	"	4/25/95	4/25/95	0	Indianola Creek	15.0305B			15,000	1100	Cowling Creek
"	"	5/5/95	5/5/95	0	Kegley	15.0254			141,718	1100	Cowling Creek
"	"	4/25/95	4/25/95	0	Kitsap Creek	15.030A			35,000	1100	Cowling Creek
1994	1995	4/25/95	5/1/95	0	Scandia Creek	15.0280			331,121	1100	Cowling Creek
"	"	4/22/95	4/22/95	0	Schutt Creek				10,000	1100	Cowling Creek
"	"	5/4/95	5/4/95	0	Steele Creek	15.0273			81,064	1100	Cowling Creek
"	"	4/19/95	4/19/95	0	Dogfish Creek	15.0285			253,021	1100	Cowling Creek
1995	1996	4/23/96	4/23/96	32	Cowling Creek	15.0298	555,484	582			Cowling Creek

"	"	4/11/96	4/11/96	0	Barker Creek	15.0255		211,195	1100	Cowling Creek
"	"	4/10/96	4/10/96	0	Clear Creek	15.0251		225,901	1100	Cowling Creek
"	"	4/24/96	4/24/96	0	Clear Brook	15.0251		210,567	1100	Cowling Creek
"	"	4/16/96	4/16/96	0	Dickerson Cr.	15.0231		237,687	1100	Cowling Creek
"	"	4/24/96	4/24/96	0	Big Scandia	15.0280		88,244	1100	Cowling Creek
"	"	4/29/96	4/29/96	0	Steele Creek	15.0273		38,144	1100	Cowling Creek
"	"	4/17/96	4/17/96	0	Dogfish Creek	15.0285		286,675	1100	Cowling Creek
1996	1997	5/14/97	5/14/97	46	Cowling Creek	15.0298	458,650	344		Cowling Creek
"	"	5/29/97	5/29/97	55	Grisdale Creek		49,935	300	1100	Cowling Creek
"	"	4/23/97	4/23/97	0	Barker Creek	15.0255		233,737	1100	Cowling Creek
"	"	5/1/97	5/1/97	0	Steele Creek	15.0273		50,202	1100	Cowling Creek
"	"	4/25/97	5/9/97	0	Indianola Creek	15.030B		24,000	1100	Cowling Creek
"	"	4/22/97	4/22/97	0	Dickerson Cr.	15.0231		401,729	1100	Cowling Creek
"	"	5/1/97	5/1/97	0	Clear Brook	15.0251		190,807	1100	Cowling Creek
"	"	4/25/97	5/9/97	0	Kitsap Creek	15.030A		24,000	1100	Cowling Creek
1997	1998	5/12/98	5/12/98	57	Cowling Creek	15.0298	615,952	373		Cowling Creek
"	"	4/29/98	4/29/98	44	North Cowling	15.0298	131,343	880		Cowling Creek
"	"	4/23/98	4/23/98	0	Barker Creek	15.0255		247,945	1300	Cowling Creek
"	"	4/23/98	4/23/98	0	Bijorgen	15.0290		17,637	1300	Cowling Creek
"	"	4/16/98	4/16/98	0	Dickerson Cr.	15.0231		235,661	1300	Cowling Creek
"	"	4/17/98	4/17/98	0	Kegley	15.0254		159,406	1300	Cowling Creek
"	"	3/31/98	3/31/98	67	Mosher Creek	15.0259	202,576	985		Cowling Creek
"	"	6/16/98	6/16/98	158	Murden Cove	15.0322	72,900	125		Cowling Creek
1998	1999	4/19/99	4/19/99	45	Cowling Creek	15.0298	534,954	480		Cowling Creek
"	"	3/18/99	3/18/99	0	Barker Creek	15.0255		219,943	1300	Cowling Creek
"	"	3/26/99	3/26/99	0	Bijorgen	15.0290		83,000	1300	Cowling Creek
"	"	3/18/99	3/18/99	0	Clear Brook	15.0251		339,750	1300	Cowling Creek
"	"	3/26/99	3/26/99	0	Clear Creek	15.0251		60,633	1300	Cowling Creek
"	"	3/10/99	3/10/99	0	Dickerson Cr.	15.0231		53,748	1300	Cowling Creek
1998	1999	3/24/99	3/24/99	0	Dogfish Creek	15.0285		5,000	1300	Cowling Creek
1998	1999	3/1/99	3/21/99	0	Indianola Creek	15.030B		10,000	1300	Cowling Creek
"	"	3/1/99	3/21/99	0	Kitsap Creek	15.030A		5,000	1300	Cowling Creek
"	"	3/19/99	3/19/99	0	Steele Creek	15.0273		91,457	1300	Cowling Creek
1999	2000	4/24/00	4/24/00	55	Cowling Creek	15.0298	492,863	394		Cowling Creek
"	"	4/20/00	4/20/00	51	Anpolis Creek	15.0202	6,000	330		Cowling Creek
"	"	3/23/00	3/23/99	0	Barker Creek	15.0255		230,776	1200	Cowling Creek
"	"	3/30/00	3/30/00	0	Bijorgen	15.0290		34,000	1200	Cowling Creek
"	"	3/23/00	3/23/00	0	Clear Creek	15.0251		173,538	1200	Cowling Creek
"	"	3/30/00	3/30/00	0	Dogfish Creek	15.0285		239,643	1200	Cowling Creek
"	"	4/24/00	4/24/00	55	Mosher Creek	15.0259	5,000	300	1200	Cowling Creek
"	"	3/30/00	3/30/00	0	Steele Creek	15.0273		73,000	1200	Cowling Creek
2000	2001	4/24/01	4/24/01	35	South Cowling	15.0298	599,424	743		Cowling Creek
"	"	4/24/01	4/24/01	35	North Cowling	15.0298	199,994	460		Cowling Creek
"	"	5/3/01	5/3/01	44.00	North Cowling	15.0298	580,906	458		Cowling Creek

- 10.4) Actual dates of release and description of release protocols.**
(See 10.3 Table above). Cowling Creek fed fry are released at midnight on a high tide. The egg box releases are volitional.
- 10.5) Fish transportation procedures, if applicable.**
Eyed eggs are transferred by truck from Cowling Hatchery to the satellite incubation facilities. The eyed eggs are wrapped in water saturated burlap bags inside transport boxes
- 10.6) Acclimation procedures.**
Outmigrating fry naturally imprint on their stream/estuary.
- 10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.**
None.
- 10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.**
Not allowed to happen.
- 10.8) Fish health certification procedures applied pre-release.**
NWIFC protocols are followed.
- 10.9) Emergency release procedures in response to flooding or water system failure.**
Cowling Hatchery is designed to pass the fish downstream during flood events.
- 10.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.**
Cowling Creek Hatchery remains a small production facility, unlikely.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

- 11.1) Monitoring and evaluation of “Performance Indicators” presented in Section 1.10.**
Cowling Creek Adult Recapture facility counts 100% of the adult chum returning to Cowling Creek. Tribal stream surveyors monitor the escapement of chum returning to all the major streams in East Kitsap, including those streams with satellite incubation facilities.
- 11.1.1) Describe plans and methods proposed to collect data necessary to respond to each “Performance Indicator” identified for the program.**
A. Data is kept on all spawning activities, including total number spawned, sex, eggs fertilized and eggs sold. 200 scale samples are taken every week throughout the run.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

There are sufficient monies, person power and facilities to maintain this program.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Hatchery rack sampling takes place a time when chinook runs are over. Stream surveys to count chum salmon generally occur on streams too small to support listed species.

SECTION 12. RESEARCH

12.1) Objective or purpose.

There are no chum salmon research projects occurring at this time.

12.2) Cooperating and funding agencies.

12.3) Principle investigator or project supervisor and staff.

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

12.6) Dates or time period in which research activity occurs.

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

12.8) Expected type and effects of take and potential for injury or mortality.

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached “take table” (Table 1).

12.10) Alternative methods to achieve project objectives.

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

(e.g. “Listed coastal cutthroat trout sampled for the predation study will be collected in compliance with NMFS Electrofishing Guidelines to minimize the risk of injury or

immediate mortality.”).

SECTION 13. ATTACHMENTS AND CITATIONS

Include all references cited in the HGMP. In particular, indicate hatchery databases used to provide data for each section. Include electronic links to the hatchery databases used (if feasible), or to the staff person responsible for maintaining the hatchery database referenced (indicate email address). Attach or cite (where commonly available) relevant reports that describe the hatchery operation and impacts on the listed species or its critical habitat. Include any EISs, EAs, Biological Assessments, benefit/risk assessments, or other analysis or plans that provide pertinent background information to facilitate evaluation of the HGMP.

Please find attached a paper presented at the NWFCC conference in 1997.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

“I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973.”

Name, Title, and Signature of Applicant:

Listed species affected: _____		ESU/Population: _____		Activity: _____	
Location of hatchery activity: _____		Dates of activity: _____		Hatchery program operator: _____	
Type of Take		Annual Take of Listed Fish By Life Stage (<i>Number</i>			
		Egg/Fry	Juvenile/Smolt	Adult	
Observe or harass a)					
Collect for transport b)					
Capture, handle, and release c)					
Capture, handle, tag/mark/tissue sample, and release d)					
Removal (e.g. broodstock) e)					
Intentional lethal take f)					
Unintentional lethal take g)					
Other Take (specify) h)					

- a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
- b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
- c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
- d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
- e. Listed fish removed from the wild and collected for use as broodstock.
- f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
- g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
- h. Other takes not identified above as a category.

Instructions:

1. An entry for a fish to be taken should be in the take category that describes the greatest impact.
2. Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).
2. If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.